

ABSTRACT OF THE DISCLOSURE:

A data storage unit having a data storage layer with multiple storage areas having a medium disposed thereon that changes between a plurality of states for writing and reading information thereon includes an array of light emitters, such as laser light probes or near-field light sources, spaced in close proximity to the data storage layer for selectively directing light beams to the data storage layer during write and read phases. Data is stored by directing a first light beam to the medium to change to a state representative of data. Data is read by exciting the storage areas with a second directed light beam on the medium. Alternately, the light energy beams in the write or read phases may be generated by a near-field optical system generating evanescent fields. The medium generates electron-hole pairs having substantially different activity in each storage area, depending upon its state. The electron-hole pairs generate activity in a detection region in communication with the storage area that is measured to detect the presence of data. The detection region may comprise a semiconductor diode junction, a photoconductive region or a photo-luminescent region. The presence of data in the storage areas is determined by the number of carriers flowing across the semiconductor junction, the number of carriers flowing in the photoconductive regions between electrodes, or the number of photons generated in the detection portion of the photo-luminescent region.